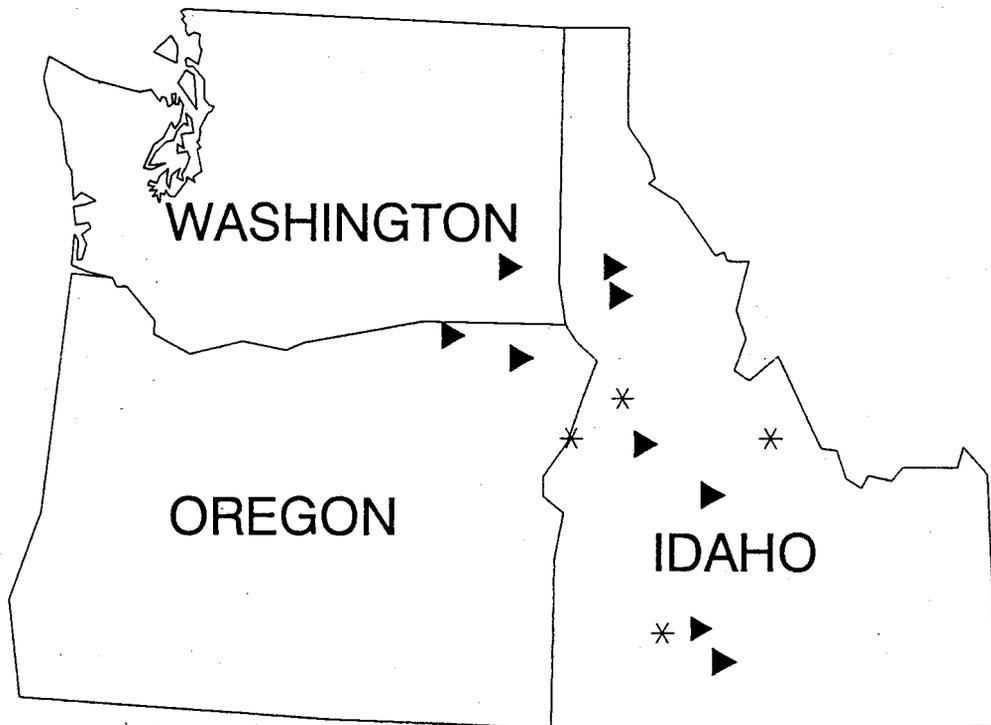


# Snake River Hatchery Review

## 1990 Workshop Summary



Compiled by:

Lower Snake River Compensation Office

Boise, Idaho

April 1991

## Acknowledgements

Many individuals from Idaho, Oregon, and Washington helped make this workshop be a success. Ken Witty, Oregon Department of Fish and Wildlife (ODFW), was responsible for calling the initial organization meeting and developing the program. Ed Crateau and Dan Herrig, Lower Snake River Compensation Plan Office (LSRCP), and Ken worked together to make sure all agencies and tribes were contacted, invited, and received instructions on the content of their presentations. Bill Hutchinson and Tom Rodgers, Idaho Department of Fish and Game (IDFG), and Ed made all the local arrangements with the Owyhee Plaza Hotel. Tom McArthur, IDFG, set up the computers for registration and Tammy Froscher, LSRCP, and Sharon Bushong, IDFG, handled registration. Gene McPherson and Rick Alsager, IDFG, took care of all audio-visual needs and did a great job with the two hosted social hours. Dan, Ed, and Tammy of the LSRCP Office compiled the materials to produce this document, and the printing costs were paid by the LSRCP Program.

The greatest efforts, however, were put forth by the speakers from the agencies and tribes whose presentations are summarized below. Their energy, enthusiasm, and excellent delivery and visual aides, combined with the active participation by all those who registered and attended, made this a successful workshop.

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## Introduction

In early 1990 the idea to conduct a Snake River Hatchery Review Workshop was conceived by Jim Martin (ODFW) and Steve Huffaker (IDFG). An initial organization meeting was requested by Jim and held in Boise on August 28 to discuss the idea and develop a draft program. Assignments were made at that meeting and the workshop date was set for December 11, 1990. The purpose of the workshop, developed from the organization meeting, was to review and critique all ongoing anadromous fish hatchery programs in the Snake River basin.

The following is a synopsis of that first Snake River Hatchery Review Workshop held in Boise, Idaho, at the Owyhee Plaza Hotel on December 11 to 13, 1990. Representatives from agencies and tribes operating or planning future operations of fish hatcheries in the basin came prepared to review their programs with a 30 minute to 2 hour presentation covering the following six items:

- 1) management objectives of each affected subbasin,
- 2) production goals of each hatchery program (smolts and adults),
- 3) broodstock development and management plans,
- 4) success in achieving goals/objectives,
- 5) factors limiting success, and
- 6) solutions to problems/needs.

Each presentation was immediately followed by a 15 to 45 minute question and answer period. A written synopsis of the presentations (including copies of most slides) is contained in the following pages.

Following the presentations, a panel was assembled to discuss the workshop presentations and to answer questions from fellow panel members and the audience. A synopsis of that panel's remarks and the question and answer period follows the presentations section.

As you read and use this document, some questions will undoubtedly arise. In most cases, you should contact the individuals who made the presentations for answers. (Addresses of all those who registered is provided at end of the document.) Keep in mind that the meeting was not recorded. This necessitated that the panel segment and question and answer period be compiled by individuals assigned to take notes. We attempted to record the proceedings as accurately as possible.

Many favorable comments were received by those of us who organized the workshop. Some suggested we hold a similar workshop in two years to get an update on our progress - with support, this may occur. We're sure all who attended gained insight and left with ideas on how programs could and should be improved. Our charge is to search for the proper changes and implement them.

**Snake River Hatchery Review Workshop  
Owyhee Plaza Hotel  
Boise, Idaho**

Registration: Tuesday from 10 am - 5:30 pm  
Wednesday 7:30 am - noon

Tuesday Afternoon, December 11

**Introductory Session - Chris Christianson (ODFW), Chairman**

- 1:00 - 1:05 Welcome - Chris Christianson
- 1:05 - 1:10 Housekeeping Announcements - Ed Crateau (FWS)
- 1:10 - 1:20 Introductions and Workshop Purposes - Jim Martin (ODFW)
- 1:20 - 1:40 Keynote Address - *Hatcheries; Then and Now* - Wally Steucke  
(Columbia Basin Fish and Wildlife Authority)

**Lower Snake River Compensation Plan Technical Session - Ed Crateau (FWS),  
Chairman**

- 1:40 - 2:10 LSRCP Overview - Dan Herrig (FWS)
- 2:10 - 3:10 Oregon Program - Rich Carmichael (ODFW)
- 3:10 - 3:30 BREAK
- 3:30 - 4:00 Oregon Program Discussion
- 4:00 - 4:45 Washington Wildlife Program - Mark Schuck (WDW)
- 4:45 - 5:15 Washington Wildlife Program Discussion
- 5:30 Hosted Happy Hour

Wednesday Morning, December 12

**LSRCP Technical Session continued - Ed Crateau, Chairman**

- 8:00 - 8:45 Washington Fisheries Program - Bob Bugert (WDF)
- ~~8:45 - 9:15 Washington Fisheries Program Discussion~~
- 9:15 - 10:00 Idaho Program - Dave Cannamela (IDFG) and Travis Coley (FWS)
- 10:00 - 10:30 BREAK
- 10:30 - 11:15 Idaho Program (continued)

11:15 - 12:00 Idaho Program Discussion

12:00 - 1:00 LUNCH (Buffet - included in the registration fee)

Wednesday Afternoon, December 12

Idaho Power, Dworshak, NEOH and Nez Perce Hatchery Technical Sessions -  
Bill Hutchinson (IDFG), Chairman

1:00 - 2:30 Idaho Power Program - Paul Abbott (IPCO), Kent Ball (IDFG)

2:30 - 3:00 Idaho Power Program Discussion

3:00 - 3:30 BREAK

3:30 - 4:30 Dworshak Steelhead Mitigation Program - Bill Miller (FWS)

4:30 - 5:00 Dworshak Program Discussion

Thursday Morning, December 13

Idaho Power, Dworshak, NEOH and Nez Perce Hatchery - Technical Session  
continued - Bill Hutchinson (IDFG), Chairman

8:00 - 8:30 NEOH Program - Ed Larson, Don Bryson (NPT)

8:30 - 8:45 NEOH Program Discussion

8:45 - 9:15 Nez Perce Hatchery Program - Ed Larson, Grant Walker (NPT)

9:15 - 9:30 Nez Perce Hatchery Program Discussion

9:30 - 10:00 BREAK

Panel Discussion - Dan Herrig (FWS), Facilitator

10:00 - 11:45 Steve Huffaker, Chief, Bureau of Fisheries, IDFG  
Jim Martin, Chief, Fisheries Division, ODFW  
Chris Randolph, Aquatic Program Coordinator, Idaho Power Co.  
Paul Kucera, Program Manager, Fisheries  
Bill Shake, Assistant Regional Director, FWS  
Lt. Colonel Robert D. Volz, Commander, Walla Walla District,  
Corps of Engineers

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11:45 - 12:00 Wrap-up - Jim Martin (ODFW)

## Lower Snake River Compensation Plan Overview

Dan Herrig

The purpose of my presentation is to 1) provide a historical perspective on the LSRCP Program; 2) explain steps in the LSRCP's authorization and development; 3) explain how the adult goals and the hatchery needs (i.e. sizes) were determined; 4) describe the original and final concepts for the program's development; and 5) point out some of the problems associated with achieving and measuring success.

### Early History - 1945 to the 1960

The four Snake River dams were authorized in 1945 with no fish mitigation (figure on page 8). Adult ladders and a few other features were incorporated when the first dam was funded for construction in 1954. Ice Harbor was the first dam completed in 1961 and Lower Granite the last in 1975. From 1962 (when an accurate count of fish entering the Snake River could be made at Ice Harbor) to 1975, there was a significant drop in adult migration. Much of this drop was attributed to the four new dams:

- Fall chinook runs underwent a 91% reduction
- Spring/summer chinook a 55% reduction
- Steelhead a 86% reduction

### Plan Development and Authorization

Planning by fish and wildlife agencies for mitigation of fish and wildlife losses began in 1959. Fish and wildlife agencies produced three Fish and Wildlife Coordination Act Reports (CAR) for the first three dams from 1959 to 1963; in 1966 the Corps requested that a single CAR be written to cover all facilities. Finally, in 1972 a Special Report was written by the state and federal fish and wildlife agencies for all four dams (figure on page 9). The Corps used that report and others they produced to write their 1975 Special Report -- that report became the document Congress used to authorize the LSRCP in 1976.

### Adult Compensation Analyses

While other sources of losses were acknowledged, the 1972 CAR and 1975 Special Report by the Corps assigned most of the losses caused by the Snake River dams to smolt turbine mortality. The agencies agreed that 15% per dam was a good estimate of turbine mortalities -- this rate computes to a total loss for all four dams of 48% of all migrating smolts. To determine the adult losses attributable to the dams, the agencies estimated the (highest) adult returns of each species and race to McNary Dam; and, using the newly available Ice Harbor counts, they were able to estimate the fraction of the Columbia River

run destined for the Snake River (figure on page 9). Since fall chinook spawning habitat also was lost for an estimated 5,000 adults, the 48% loss was computed on 27,663 of the 32,663 fish run -- and the 5,000 was then added to that product. There was some controversy over using maximum counts to determine the adult runs; an Oregon report helped justify this approach.

#### Production Model Development

A production model for determining the proper amount of hatchery space for each species was developed by an agency subcommittee in 1974. This was done by making several survival assumptions and back calculating from adult goals to number of females needed for spawning (figures on pages 10 and 11). Since this production model became part of the Corps 1975 Report and the authorizing document for the LSRCP, some of these figures are very important.

There are two constants in the models, the pounds of smolts that can be produced and the adult return goal. Although all the other estimates, including smolt-to-adult return rates, are and have changed, the LSRCP program is restricted 1) by the authorized hatchery capacity to produce a limited number of pounds and 2) by the authorized adult return goals. The fall chinook subyearling target size has changed, for example, to less than 90 fpp, which greatly reduces the potential smolt production numbers. WDF has been investigating 10-12 fpp yearling releases, which would further reduce releases. As another example, our ability to return steelhead from most smolt release sites was probably underestimated; therefore, the original model's smolt-to-adult return rate may be too low.

#### Hatchery Development Plan

Hatchery development plans were also drafted by an agency subcommittee in 1974 to help determine where and how large hatcheries should be located. The team estimated the losses by river reach for each of species/run to provide a guide as to how compensated returns should be allocated (figure on page 11). The bulk of the spring and summer chinook losses were thought to be in the Salmon River basin, the fall chinook losses in the mainstem Snake, and the steelhead in the Clearwater and Salmon Rivers. The committee footnoted this allocation table by saying their estimates were not intended to be used to determine specific release sites.

The Corps hired consultants to analyze their draft fish and wildlife compensation plans and those of the agencies. Ernest Salo reviewed the CAR and the Corps draft Special Report and stated that: 1) the program was urgently needed; 2) several smaller rather than a few larger facilities was best; 3) maintenance of stock integrity (genetic fitness) was necessary; 4) the hatchery must fit in with the environment; 5) the fall chinook hatchery should be in the basin; 6) other mitigation measures must be considered in the program's development; 7) managers should strive for 48% hatchery and 52% wild fish returning to the basin; and 8) the LSRCP should fit with other basin programs.

Salo's comments influenced the adoption of some non-adult goals; namely, IN-KIND AND IN-PLACE return goals. And these goals eventually affected hatchery

siting plans. The final 1975 Report contained two statements concerning maintaining stock integrity and placing the hatcheries and related facilities throughout the basin where the losses occurred (figure on page 12).

The initial siting plans placed some facilities outside the basin; where as, the final plans placed the hatcheries and facilities closer to the losses. Several chinook and steelhead hatchery sites were changed from the originals (figures on page 13).

#### Achieving and Measuring Success

I believe there are some things to consider when determining LSRCP adult return success (figure on page 14). Among them are:

- Fall chinook adult goals are to be measured to the project area -- i.e. to above Ice Harbor.
- Spring/summer chinook adult goals are to be measured above the project -- meaning above Lower Granite. A problem arises here however -- where does the Tucannon River program fit?
- Steelhead goals are also measured above the project. Where does this leave the WDW steelhead program in the Tucannon and Walla Rivers?

In terms of achieving goals, we have two constants to consider:

- The adult goals are firm -- but do they all need to be hatchery-reared fish? What part should supplementation play in returning adults.
- We have a fixed amount of hatchery rearing space authorized for construction, how flexible can/should we be in reallocating the space among the species and runs?

Ultimately, the question is will the flexibility we do have in the program allow us to achieve our goals of replacing the lost fish and fisheries?



- **Early History - 1945 to the 1960's**
- **Plan Development and Authorization**
- **Adult Compensation Analyses**
- **Production Model Development**
- **Hatchery Development Plans**
- **Achieving and Measuring Success**

## **Snake River Dam Construction Authorized in 1945**

- **No Fish Mitigation Authorized**
- **Construction Completed:**
  - Ice Harbor in 1961**
  - Lower Monumental in 1969**
  - Little Goose in 1970**
  - Lower Granite in 1975**

## Steps to LSRCP Authorization

- 1972 Fish and Wildlife Coordination Act Report  
State and Federal Fish and Wildlife Agency  
Report to the Corps of Engineers
- Lower Snake River Compensation Plan Document  
Corps 1975 Special Report to Congress
- Water Resources Development Act of 1976  
Congress Authorized the LSRCP in accordance  
with the 1975 Special Report

|   | Fall<br>Chinook  | Spring-Summer<br>Chinook | Steelhead<br>Trout   |
|---|------------------|--------------------------|----------------------|
| McNary Count<br>(Year of Count)               | 97,500<br>(1958) | 222,100<br>(1957)        | 172,600<br>(1962-63) |
| Maximum Percent<br>over Ice Harbor            | 33.5%            | 55%                      | 66.5%                |
| Estimated Snake<br>River run*                 | 32,663           | 122,200                  | 114,800              |
| Lower Snake Project<br>related adult losses** | 18,300           | 58,700                   | 55,100               |

\* McNary count times maximum percent over Ice Harbor.

\*\* Estimated Snake R. run times 48% (total estimated turbine-related losses). Except for fall chinook, where adult loss = (Snake R. run - 5,000 adults) X 48% + 5,000 adults. The 5,000 adults is credited for those that would have spawned in the immediate area. That loss was direct and therefore it's added in directly.

## Hatchery Production Model Fall Chinook

|                         |            |
|-------------------------|------------|
| Adult Return Goal       | 18,300     |
| Smolt to Adult Survival | 0.2        |
| Smolt Number            | 9,160,000  |
| Smolts per pound        | 90         |
| Pounds of Smolts        | 101,800    |
| Egg to Smolt Survival   | 80         |
| Egg Requirement         | 11,450,000 |
| Eggs per Female         | 5,000      |
| Number of Females       | 2,290      |

## Hatchery Production Model Spring and Summer Chinook

|                         |           |
|-------------------------|-----------|
| Adult Return Goal       | 58,700    |
| Smolt to Adult Survival | 0.87      |
| Smolt Number            | 6,750,000 |
| Smolts per pound        | 15        |
| Pounds of Smolts        | 450,000   |
| Egg to Smolt Survival   | 70        |
| Egg Requirement         | 9,650,000 |
| Eggs per Female         | 4,500     |
| Number of Females       | 2,145     |

## Hatchery Production Model Steelhead Trout

|                         |            |
|-------------------------|------------|
| Adult Return Goal       | 55,100     |
| Smolt to Adult Survival | 0.50       |
| Smolt Number            | 11,020,000 |
| Smolts per pound        | 8          |
| Pounds of Smolts        | 1,377,500  |
| Egg to Smolt Survival   | 65         |
| Egg Requirement         | 16,950,000 |
| Eggs per Female         | 5,000      |
| Number of Females       | 3,390      |

## Allocation of Losses By River Reach

|                        | Spring/Summer | Fall          | Steelhead     |
|------------------------|---------------|---------------|---------------|
| <b>Snake R.</b>        |               |               |               |
| Below Lewiston         |               | 5,000         |               |
| Lewiston to HCD        |               | 9,728         | 2,208         |
| To Hells Canyon        | 1,200         | 3,648         | 2,736         |
| <b>Tucannon R.</b>     | 1,152         |               | 1,632         |
| <b>Clearwater R.</b>   | 288           | 68            | 20,736        |
| <b>Asotin Ck.</b>      |               |               | 816           |
| <b>Grande Ronde R.</b> | 5,856         |               | 7,632         |
| <b>Salmon R.</b>       | 46,656        |               | 16,896        |
| <b>Imnaha R.</b>       | 3,216         | 68            | 1,920         |
| <b>Other Tribs</b>     | 288           |               | 528           |
| <b>TOTALS</b>          | <b>58,656</b> | <b>18,512</b> | <b>55,104</b> |

# GOALS

- In-kind
- In-place

**The 1975 Special Report stated:**

- "...integrity of individual stocks of fish native to a particular watershed should be preserved as much as possible."
- "... agencies have suggested the construction of several smaller hatcheries rather than a lesser number of large 'super hatcheries'..."

## Hatchery Siting Plans Chinook

### Initial

#### Fall:

1- Pasco, WA

#### Summer:

1- McCall, ID

#### Spring:

1- Pasco, WA

2- Lostine, OR

3- Imnaha, OR

4- Powell, ID

5- McKay, ID

### Final

1- Lyons Ferry, WA

1- McCall, ID

1- Lyons Ferry, WA

2- Lookingglass, OR

3- Dworshak, ID

4- Clearwater, ID

5- Sawtooth, ID

## Hatchery Siting Plans Steelhead Trout

### Initial

1- Rocky Ford, WA

2- Lostine, OR

3- Imnaha, OR

4- Powell, ID

5- Briggs Springs, ID

### Final

1- Lyons Ferry, WA

2- Irrigon, OR

3- Clearwater, ID

4- Hagerman, ID

5- Magic Valley, ID

## Measuring Success

"Above" versus "To the Project Area"

Fall chinook:

"...facilities...capable of returning  
18,300 adults to the project area."

Spring/summer chinook:

"...facilities...capable of returning  
58,700 adults above the project..."

Steelhead:

"...facilities...capable of returning  
55,100 adults above the project..."

## Achieving Goals

Fixed Conditions/Goals:

- Adult Return Numbers
- Hatchery Rearing Space

Flexible Conditions/Goals:

- Smolt Size
- Smolt Numbers
- Rearing densities